Written Evidence Submissions

Contents

Advanced Accelerator Applications (AAA)

Introduction

AAA, a Novartis company, would like to thank the APPG for Radiotherapy for the opportunity to respond to this inquiry. We are pioneers of an evolving pillar of oncology and innovative form of precision medicine, radioligand therapy (RLT). Radioligand therapies are delivered to patients by molecular radiotherapy services – an expanding part of the NHS radiotherapy landscape.[1]

Our mission is to transform the lives of people with cancer using expertise in oncology to develop targeted radioligand therapies for the benefit of patients in the UK and beyond. Radioligand therapy is a type of cancer therapy that can offer life-enhancing treatment by delivering precision therapeutic radiation to cancer cells anywhere in the body, administered via the bloodstream.[2] The NHS has already taken positive steps to ensure that patients can benefit from this treatment approach in a rare form of neuroendocrine cancer.[3]

Please give any views, from personal or professional experience, on whether the UK radiotherapy provision is able to cope with urgent present and future challenges in cancer care.

One form of RLT is currently recommended for use amongst patients with a rare form of neuroendocrine tumours.[3] However, there are over 30 RLTs in Phase II/III trials across multiple companies, and over 200 trials have been registered.[4] Over the medium to long-term, RLTs have the potential to be used in several oncology indications.[1]

If RLT is to be integrated into cancer care and radiotherapy services more widely in a way that will benefit current and future patient populations, there are several factors that must be addressed, including:

- Greater NHS readiness for radioligand therapy, in terms of physical infrastructure and capacity, workforce training and recruitment
- The Environment Agency, private contractors, and NHS trusts to have a framework for minimising the environmental impact of managing and disposing of nuclear medicine across each radioisotope
- Enhanced collaboration to deliver RLT through multi-disciplinary teams (MDTs) and clear treatment pathways for equitable access for patients

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[1] BMNS et al. (2021) Review of molecular radiotherapy services in the UK. Available at review-molecular-radiotherapy-services-uk.pdf (rcr.ac.uk) [Accessed June 2022]

[2] Strosberg J, Wolin E, Chasen B, et al. Health-Related Quality of Life in Patients With Progressive Midgut Neuroendocrine Tumors Treated With 177Lu-Dotatate in the Phase III NETTER-1 Trial. Journal of clinical oncology : official journal of the American Society of Clinical Oncology vol. 36,25 (2018): 2578-2584. doi:10.1200/JCO.2018.78.5865 [Accessed June 2022]

[3] National Institute for Health and Care Excellence (NICE). Lutetium (177Lu) oxodotreotide for treating unresectable or metastatic neuroendocrine tumours. Technology appraisal guidance [TA539]. Available at: https://www.nice.org.uk/guidance/ta539 . [Accessed June 2022]

[4] Novartis data on file

- Improved understanding and inclusion of RLT in government and NHS policy frameworks
- More consistent data collection to improve the health system's understanding and application of RLT

We believe that this will help to ensure cancer outcomes are equal to comparable countries, so that people living with cancer get the care that they deserve.

Are the existing processes, budget mechanisms and policies sufficient for delivering the innovations in IT and technology needed for world-class radiotherapy?

NHS Trusts and healthcare professionals should be supported to input into datasets such as the Cancer Patient Registry and the National Prostate Cancer Audit to maximise the value of clinical, real-world data for RLT. To identify and reduce variation in patient access and outcomes, there should also be greater scrutiny over the datasets at a national level, with actions agreed between system leaders and Trusts as required. Integrated care systems (ICSs) could have a key role to play in this.

As the use of RLT in the NHS increases, there will be the opportunity for more real-world data to be collected that will support improved understanding of long-term patient outcomes, the impact on quality of life and cost-effectiveness of the treatment. The NHS must ensure that ICSs are held accountable in delivering this type of data strategy. Importantly, to be better informed by data across England, ICSs must also work collaboratively with each other to increase interoperability.

Please detail the current status of the Radiotherapy machines and equipment from your own experience and any improvements you feel are necessary?

As an innovative nuclear medicine, RLT requires thoughtful planning with appropriate hospital facilities required to administer this safely, including radio-protected shielded rooms and toilet facilities.[1]

Updating and modernising health infrastructure should be a priority for ICSs going forward. ICSs should engage in a triage process to outline the maintenance issues that have the highest risk to patient safety. ICSs are also responsible for mapping the health needs of their local populations and ensuring that patients have adequate access to services. As part of this, ICSs should seek to ensure that patients have adequate access to innovation and that while maintenance is taking place, where possible, facilities should be future-proofed. Molecular radiotherapy (MRT) has been a neglected pillar of cancer care for many years, with the intercollegiate Review of Molecular Radiotherapy Services in the UK[1] finding that provision of MRT services is not uniform. RLT, one of the many MRTs, was highlighted in the report as having a significantly increased patient population if it is approved for treatment of mCRPC – a decision which is currently being considered by The National Institute for Health and Care Excellence (NICE).[1]

The 23 existing RLT centres in the UK are nearing maximum capacity and there is significant regional inequality with limited-service provision in areas such as the South West, the

Midlands and the North West, compared to London.[5] For example, there are only two RLT centres in the North West (Manchester and Liverpool) serving 7.2 million people. Some patients must travel up to 200 miles to access treatments, creating a postcode lottery in care.[1] One of the key reasons this variation exists is the lack of physical facilities. ICSs should collaborate with their local Operational Delivery Networks and Cancer Alliances to conduct a gap analysis of the additional infrastructure required to successfully build, or increase capacity for, an RLT service that will meet the expected increase in demand as highlighted in the intercollegiate review. To ensure patient access for those eligible for RLT in mCRPC, we believe 35 centres will need to be set up by the end of 2023.[4]

Please give some comments on Radiotherapy workforce experiences either from yourself or colleagues?

Please outline the present and future needs to the multi-disciplinary workforce in radiotherapy.

Adequate staffing across the health service is needed to improve cancer outcomes, particularly following the pandemic as the cancer backlog builds. Ensuring that the workforce is prepared for the upscaling of RLT is a key focus area for AAA. This means supporting recruitment, professional training and facilitating the integration of specialised healthcare professionals into MDTs. RLT represents a pillar of oncology treatment that requires thoughtful long-term planning, as well as enhancements to infrastructure and workforce, to ensure it can be provided to all patients who qualify for it. MDTs for RLT will need highly trained nuclear medicine specialists, clinical/medical oncologists, nurses, and physicists amongst other specialisms to deliver RLT safely and effectively to patients, and shortages in sufficiently trained staff are common.[6] Currently, there is little political awareness of the future potential of RLT. We believe that increased understanding amongst decision-makers and system leaders will support discussions around the importance of infrastructure and workforce planning.

We recommend that NHS England and Health Education England engage with Trusts to assess levels of need in relation to recruitment and professional training to futureproof the specialist nuclear medicine and oncology workforces. Further, national and local bodies should work closely with specialist organisations, such as the British Nuclear Medicine Society and the Royal College of Radiologists, to understand what investment is needed for workforce training that would benefit the clinical community.

About AAA, a Novartis company

Advanced Accelerator Applications (AAA), a Novartis company, is an innovative medicines company developing targeted radioligand therapies and precision imaging radioligands for oncology indications. We are committed to transforming patients' lives by leading innovation in nuclear medicine.

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[5] Health system readiness for radioligand therapy in the UK SITUATION ANALYSIS REPORT. Available at: https://www.healthpolicypartnership.com/app/uploads/Health-system-readiness-for-radioligand-therapy-in-the-UK-situation-analysis-report.pdf Last date accessed 14/07/2022

AAA was founded in 2002 by a physicist who had worked at the European Organisation for Nuclear Research (CERN). Novartis subsequently acquired AAA in 2018. AAA has a legacy as a pioneer in the development and delivery of radiopharmaceutical drugs for diagnostic imaging. More recently, AAA has focused its efforts on developing targeted radioligand therapies and precision imaging diagnostics that target specific markers or receptors that are over-expressed by certain types of solid tumours.[6]

[6] Advanced Accelerator Applications 'Pipeline'. Available at: https://www.adacap.com/pipeline/

Berkshire Cancer Centre, Reading.

To what degree are Government and NHS England's existing plans for radiotherapy sufficiently ambitious?

There is a lack of official data to answer properly, but given that there is no central funding for equipment at a time when all trusts need to save money, capital replacement of machines now seriously in doubt. This limits the ability to implement some of the more advanced treatment techniques, many of which reduce dose to normal tissues. This is important when living with and beyond cancer as the incidence of cancer increases.
The feeling on the ground is that of being left alone to fend for yourself, rather than feeling contained within a broader NHS England's existing ambitious plan; it is not disputed that the Radiotherapy tariff paid by NHS England will not cover all costs of running a Radiotherapy service for an NHS Trust – the central funding was playing a crucial role, and during the last years the sustainability of the Radiotherapy service was running on that assumption, particularly for the matters of replacement – let alone modernisation – of Radiotherapy equipment. So in terms of sustainability and growth of provision, it does not feel ambitions. Scientifically, whilst the UK leads in the development of Clinical Trials and that should be celebrated – the outcomes in terms of overall survival are lower for the UK than for European countries. An ambitious radiotherapy policy should focus both on the increased screening of the population to allow an early detection as much as in improving the outcomes in terms of overall survival.

Do you feel radiotherapy is given priority that its clinical importance deserves in Government policy making?

No. Despite the year of Radiotherapy in 2011, government seem unaware that at least 40% of cancer patients receive radiotherapy as part of their treatment plan. 1 in 2 of the population will get a cancer diagnosis. In 2021 the population was 67.33 million which equates to 29.93 million people in the UK requiring radiotherapy treatment as part of their care pathway.

Are the existing processes, budget mechanisms and policies sufficient for delivering the innovations in IT and technology needed for world-class radiotherapy?

No, more training spaces needed for doctors, radiographers, physicists. Funding should be available for non traditional training (e g apprentice roles) within some specialities to ensure the training is more attractive especially for mature students who may not be in a position to forfeit an income. Funding needs to be available for machine time for training, trials, in addition to caring for our patients. This may be in the form of a decant machine within departments.

The mechanism and process is not robust - by the time the budget is secured following a capital bid, there are so many administrative hurdles that it is likely that the budget will be lost (reaching the end of the financial year without being able to use it). Particularly with IT

– and absolutely everything involves IT these days – the IT department is under huge pressure to prevent any new system of any kind being vulnerable to external hacker attacks – as such, the scrutiny that everything goes through and the level of expertise required for it, makes these processes very challenging to achieve. And when this happens and we can't even try to purchase a system because the IT department is snowed under with projects, there's a double punishment – not only we are not able to spend the money secured during the capital bid due to the bureaucratic and under-resourced mechanism (the purchase is not approved until IT has approved it), but we're told that because we've underspend this year then next year the budget will be smaller as we're not using the money allocated.

In what ways can the full technological benefits of radiotherapy be realised, and what is hindering this?

Workforce challenges are a major concern. Aging machines without an agreed funded replacement programme limits engineers, physics and radiographer workforce to doing the day job as time to develop new techniques is hindered. IT provision within trust does not always support radiotherapy innovation.

Please detail the current status of the Radiotherapy machines and equipment from your own experience and any improvements you feel are necessary?

In our department one of our Linacs has been installed 12 years ago, and we do not have secured capital to replace it; the Superficial radiotherapy unit is 22 years-old, has recently broken down possibly beyond repair – again, no capital secured and we're trying to figure out what to do with the patients. And the Brachytherapy system is about to reach its end of life soon.
An agreed equipment replacement programme, potentially centrally funded to ensure up to date equipment is available is essential. Machines should be no more than 10 years old to enable techniques development and ensuring the best treatment and experience for our patients

Please give some comments on Radiotherapy workforce experiences either from yourself or colleagues?

Grossly short of staff, particularly apparent in a small department close to London but without London weighting; this challenge is not trivial – it makes it more difficult to recruit staff, as much as to retain staff which has been trained – prompting then the challenge of the staff turnover.

Please outline the present and future needs to the multi-disciplinary workforce in radiotherapy.

Do you feel that Radiotherapy is funded sufficiently in the UK?

No. Radiotherapy is one of the most cost-effective strategies for the treatment of cancer (particularly when it's compared against the cost/benefit of Chemotherapy), yet that advantage is not prioritised or exploited.

Can you give examples that could be described as 'red-tape' or bureaucracy that hold radiotherapy back from the full benefits that it can provide?

Lack of Central Funding. Workforce challenges, Training programmes as mentioned above. The time-gap between a capital bid and knowing about its outcome is constrained by a fixed calendar dates, not by the requirements of the services. Then the required approvals (even after the capital is approved) need to be requested from several fronts where there is no expertise in a general hospital around what the Radiotherapy equipment does, even with the best intentions (Procurement, IM&T, Clinical Engineering, Estates, Finance) – as Radiotherapy is a complex niche, there is understandable apprehension by all parts in approving and allowing the purchase of any capital items which they have no clue of how they operate yet they feel responsible for approving, creating a slower than necessary and bureaucratic process.

ELEKTA

Submission to APPG radiotherapy Inquiry

Radiotherapy Industry response from Elekta

We are writing as one of the key suppliers of radiotherapy equipment to the UK market to address some of our concerns regarding the cancer crisis in the UK and the provision of radiotherapy. We are committed to giving full industry support to finding and implementing solutions to the challenges faced by radiotherapy departments, to better treat cancer patients now and in the future. We support the 6- point plan and manifesto published by the APPG-RT.

Current status of radiotherapy equipment in the UK

Every calendar year an additional number of radiotherapy machines go over the ten-year expected lifespan, there are some machines that are over fifteen years old and still treating patients. For radiotherapy patients it is critical that they receive their full course of treatment in the specified time frame and do not miss treatments. Older machines place a bigger burden on spare part requirements, some parts become obsolete or difficult to obtain and their ability to deliver modern treatment regimens are limited. The planning and installation of a new linac can take eight to twelve months as capacity and staffing needs careful management (departments often must work extended hours and weekends to maintain patient treatments during installation and commissioning). From our installed base alone, we have 37 treatment machines which will need replacing in the next five years.

Funding for Radiotherapy equipment in the UK

The current system for funding replacement radiotherapy machines and updating the treatment rooms in England puts all the financial responsibility on the Trust's themselves. This often means that where there are pressures on spending, the machines are used for longer than their expected lifetime affecting the ability for radiotherapy centres to continue to deliver reliable and cutting-edge treatment techniques to patients. The planning and installation of new machines takes a lot of work which is again down to the departments to manage alongside treating patients and managing staff. Funding for radiotherapy machine replacements needs to be ringfenced and held centrally meaning that at 10 years the funds to replace a machine are available and the capital expenditure does not need to be found by the hospital Trust.

Adoption of innovation in the UK

The current funding mechanisms mean that adoption of new technologies that enhance the patient experience and improve outcomes of their treatment are not fit for purpose. If we take as an example MR Linacs which were introduced into the market in 2017, currently in the UK there is one private provider who has adopted the technology and only two NHS Trusts who were part of an early adopter partnerships with industry. The reimbursement system does not support the adoption of new technologies or the development of radiotherapy techniques that improve patient outcomes and experiences. If we compare

this to Netherlands, in the nineteen cancer centres in country, there are now twelve MR Linacs (ten treating patients and two under installation). There needs to be better funding mechanisms for centres to be able to access adequate reimbursement from the radiotherapy tariffs to allow them to adopt new technologies.

Red tape as a barrier to adoption

New software innovation to the market can speed processes up, reduce reliance on costly computer hardware and storage, improve patient outcomes and allow easier communication between providers however red tape has slowed or stopped the progression of new software within the radiotherapy community.

Written evidence submission to the APPG for Radiotherapy's inquiry into radiotherapy and the cancer crisis

Gynae Narratives Team

Written Evidence for APPG for Radiotherapy's inquiry into Radiotherapy and the Cancer Crisis from the Gynae Narratives Team

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Corinne Singleton, ex-cancer patient with lived experience of radiotherapy, Lancashire
Lorraine Salisbury, MSc, BSc, On-treatment Review Radiographer, Clatterbridge Cancer Centre NHS Foundation Trust.

We are a group of social scientists, clinical researchers, patients and practitioners, who have been working together on the Gynae Cancer Narratives Project.

The aims of the Gynae Cancer Narrative Project (GCNP) were to:

- Increase understanding of how radiotherapy impacts on social, personal and sexual lives; and
- Improve future patient experiences of living with the social and personal impacts of radiotherapy.

In 2020, we invited patients to participate in the project by narrating their experiences of undergoing radiotherapy treatment for a gynaecological cancer. We were overwhelmed by what they shared, and draw on their experiences in submitting evidence to your inquiry.

It is our opinion, based on the work we have conducted, that current UK radiotherapy services are unable to meet patient needs in cancer care. In a book published as part of the project, we launched a manifesto for change, aimed at driving change in radiotherapy for gynaecological cancer. The ten point manifesto stated:

1. **Practice radiotherapy as an on-going conversation** between patients and practitioners. Solicit and invite patients' questions: **view every question as important** and requiring an answer (not just a leaflet).
2. Acknowledge that **every patient trajectory is unique:** non-linear, emotional, social, intimate and physical. It begins before diagnosis and extends beyond treatment.
3. **Prioritise what the patient is feeling and experiencing** over the goals of the treatment.
4. Begin every interaction by appreciating that **illness and treatment disrupts patients' lives** in countless ways.
5. **Give space and time for each patient to be upset and feel heard,** and value their particular experiences.

6. **Demand services that promote and prioritise dignity.**
7. Remember that **attending to the sexual self is part of caring for and treating gynaecological cancer**.
8. **Demand acknowledgment of and care for late effects.**
9. **Avoid language that unnecessarily medicalises parts of the body.**
10. **Demand equal patient access to all services.**

We have elaborated on three of those points below. Further information from the book can be found online here: https://online.flippingbook.com/view/1072866826/

Demand acknowledgment of and care for late effects.

Ambitions for radiotherapy in England remain wedded to technological development or innovation, at times to the determent of care. Technological focus has enabled earlier diagnosis and innovation in radiotherapy delivery, contributing to half of cancer patients now surviving 10 years or more.

However, this technological focus has resulted in a lack of support for people post-treatment and inadequate understanding of patient needs relating to late effects of radiotherapy. Linac replacement programmes form much of the basis of development yet these should be an axiomatic base line rather than an ambition to be applauded or celebrated. Further investment is needed beyond the technological - in the people needed to deliver these innovations, and in the care for people who survive longer due to their advances. Macmillan estimate that there are currently 3 million people living with cancer in the UK. They predict this will rise to 3.5 million by 2025, 4 million by 2030, and 5.3 million by 2040. It is imperative that support for late effects, sometimes occurring more than five years after completion of radiotherapy and when follow-up has been concluded, is a part of the radiotherapy policy conversation. Discussion must look beyond treatment delivery and ensure that people are supported to live with the effects of treatment.

Begin every interaction by appreciating that illness and treatment disrupts patients' lives in countless ways.

Participants described how late effects of treatment impacted on work, finances, social life, mental, emotional and sexual health, and daily routines and further treatment, including direct financial effects. In 2013, Macmillan reported on Cancer's Hidden Price Tag, stating that a third of people living with or beyond cancer had stopped work either permanently or temporarily, while a further 8% had been forced to reduce their hours or take unpaid leave.

> *One unfortunate fall-out from this is that I have had my Personal Independence Payment stopped, as they do not recognise the after-effects of cancer treatment… so life is now more of a struggle than it was before.*
> **Georgina**

Some women felt obliged to return to work before they were ready, due to lack of support and understanding from employers, and financial situations.

> *I went back to work as soon as I went to half pay, as we needed the money – I wasn't really ready and feel there should be more help for cancer sufferers.* **Teresa**

Participants reported how radiotherapy and its long-term effects affect their relationships and wellbeing, as well as that of those around them. Participants reported the negative impacts of side effects, pelvic radiation disease and lymphoedema, on their self-esteem, due to their changed appearance, pain, discomfort and mobility issues.

> *[M]y cancer treatment has finished, [but] my life will never be the same and family and friends don't understand that. I then feel guilty I feel this way, as I know I'm lucky to still be alive and have to learn to live with the side-effects.* **Anna**

> *I'm having trouble finding some compressions that I wear that don't cause my other vulva/groin conditions worse. I can't wear the same clothes or shoes anymore and now hate the summer months. I hate the way I look, so don't want to go [out] much anyway.* **Anna**

> *I wish I'd known that that the effects of the surgery and treatment would never go away.* **Teresa**

Practice radiotherapy as an on-going conversation between patients and practitioners. Solicit and invite patients' questions: view every question as important and requiring an answer (not just a leaflet).

Most people are aware that radiotherapy places demands on patients. However, participants described how often those demands are downplayed or not made clear by clinical staff, sometimes for fear of distressing patients.

> *I'm still very angry that any link between radiotherapy and my symptoms was strongly denied. The gastroenterologist said, "I can't say officially there is a link, but I see a lot of people like you" … it was a sort of unspoken secret.* **Donna**

The narratives suggested that women wanted to be made aware of what it might be like to **live** the demands that radiotherapy could put on them – prior to, during and long after treatment – so that they could prepare and understand their bodies and lives better.

However, when our findings were discussed in a recent meeting of Clinical Oncologists and Surgeons, the group highlighted that there simply isn't time for the length of conversation needed to cover all acute and potential chronic side effects of treatment, acknowledging that consent under the current circumstances cannot be fully informed (December, 2022). We are failing radiotherapy patients by not fully consenting them for the future.

This is further highlighted by the quotes from participants below:

> *I recently re-read the [information leaflet] about radiotherapy while doing this and I commented to a friend that I think it was the Disney version I read…. I really wasn't scared or nervous of the treatment but I think I should have been more aware of it. I think the information you get should be more realistic and be told what can happen mentally and physically.* **Kathleen**
>
> *I felt I was making an informed choice, sadly that wasn't the case. So much information was lacking*. **Georgina**
>
> *Side-effects to treatment were mentioned … this may have been related to the stress at the time and my fear, but I feel it would have been helpful to have this discussed more frequently throughout treatment so I could have prepared myself more for what was to come.* **Melissa**

Summary

We challenge the ordinary understanding that the focus of radiotherapy should be on technological treatment techniques, rather than on holistically supporting patients. We urge your inquiry to place equal emphasis on experiences of being a person with cancer, as well as when, where and how radiotherapy can be delivered. This is crucial to meet the mental and physical health of people living well beyond their cancer treatment.

IPEM

APPG for Radiotherapy inquiry
About the Institute of Physics and Engineering in Medicine (IPEM)

- IPEM is a professional association and Learned Society with around 4,700 members working in hospitals, academia and industry, who are medical physicists, clinical and biomedical engineers and technologists working with applications of physics and engineering applied to medicine.
- Our mission is to constantly improve human health by the application of physics and engineering to the prevention, diagnosis and treatment of disease through research, innovation, education and clinical practice.
- As a charity, IPEM's aim is to promote for the public benefit the advancement of physics and engineering applied to medicine and to advance public education in the field. We do so by supporting and publishing research and supporting the dissemination of knowledge and innovation through project funding and scientific meetings; and by setting standards for education, training and continuing professional development for healthcare scientists and clinical engineers.

We need to ensure an adequate and secure supply of medical radionuclides, for both diagnostic and therapeutic purposes. For example, many cancer therapies have been cancelled or significantly delayed due to vulnerabilities in I-131 supplies. Diagnostic imaging using Tc-99m was limited on occasions in the last year due to shortages of Mo-99. The suggestion is to expand production capacity for medical radionuclides by supporting development of a new research reactor in the UK.

Ensure new radionuclide treatments, for example, Lu-177 PSMA for treatment of prostate cancer, can be delivered across the country (that is, local to patients) at a high standard and with suitable pre- and post-therapy imaging to tailor the treatment to the individual and ensure safety of treatment. This will require increased staffing, increased investment in training, possibly the creation or expansion of facilities for local delivery of molecular radiotherapies.

IPEM would support centralised funding for a country-wide replacement programme for radiotherapy equipment that should include Estates enabling works where required. It would be worth exploring the model employed in NHS Scotland where a comprehensive and fully funded radiotherapy equipment replacement programme has existed for a number of years.

Although there were a small number of Linear accelerators purchased using centralised funds recently, these were purchased via a last minute, non-transparent and relatively unorganised process due to very short timescales. The purchases came with a mountain of bureaucracy, and the application process was hugely oversubscribed. Decisions taken on which hospitals were successful, and how those decisions were made, were not made widely available to providers.

Looking forward, there is still no commitment for radiotherapy equipment replacement, which makes it very difficult to plan a replacement programme within a NHS Trust while delivering a clinical service.

The rollout of Proknow has largely been successful in England and should be able to support the communication between clinical colleagues, enabling peer review of rare tumour sites, thereby improving standardisation and quality of treatment for patients. It is critical, however, that services are suitably resourced to take maximum advantage of the software.

Building on this, there should be an initiative to increase access to new Artificial Intelligence technologies that will enable auto-contouring and auto-planning for radiotherapy. Both will potentially bring much needed efficiencies to radiotherapy workflow. This should be done at the same time as longer-term investment in the training of the radiotherapy workforce, so there is sufficient expertise in place to gain the most benefit from AI advances. IT infrastructure and network capacity needs to be fit for this purpose.

A review of patient access to services should also be made. The pandemic has highlighted how critical it is for patients to have good local access to radiotherapy facilities.

There should be adequate scientific resource (for example, MR Physics) input into the design, delivery and translation of clinical imaging research trials for cancer. Also having the expertise to enable and optimise the findings from such trials once they become accepted clinical practice. Ensuring these techniques are available to as wide a range of the population as possible (that is, not just very specialist centres) may well involve our input across our networks, as CDCs are established - including having appropriately specified scanners and support for sequence optimisation etc.

However, IPEM has major concerns that scientific and engineering professionals specialising in radiotherapy are not being considered in any Cancer Workforce plan.
Clinical Scientists, Clinical Technologists and Radiotherapy Engineers are all an essential part of the workforce enabling delivery of radiotherapy to patients with cancer - indeed, Clinical Scientists with sufficient additional knowledge and experience to be formally certified as Medical Physics Experts (MPEs) are a requirement by law (reference: IR(ME)R17).

In a recent radiotherapy workforce survey, the vacancy rates were confirmed for each of these professions at between 7% and 10%. This clearly indicates major investment is needed to get the radiotherapy physics workforce up to establishment, and yet more to increase capacity for the backlog created by the pandemic. However, there have been no commitments made to resource an increase in any of the specialisms, via any training routes.

In addition to this, recent research by IPEM has shown the Diagnostic Radiology and Radiation Protection (DR&RP) workforce in medical physics is less than half the level recommended by established staffing models, with some services working at less than one-third of what is recommended.

Almost 800 additional Clinical Scientists and technologists are needed to meet both the existing workforce need and the planned growth in the NHS diagnostic capacity. This figure includes an extra 220 medical physicists as recommended by the Richards Report in 2020 to NHS England on Diagnostic Services to keep pace with patient demand.

The DR&RP workforce has a high vacancy rate, with a 9% vacancy among Clinical Scientist posts and 7% among technologist posts. To meet the required staffing levels in future, the number of scientists and technologists recruited annually to training posts needs to increase significantly to five times the current intake.

The backlog caused by the Covid-19 pandemic is adding to delays to patients being seen and the lack of adequate staffing levels is also contributing to difficulties in implementing community diagnostic centres, or 'one stop shops' for diagnostic services, promised as part of the Richards Report. However, there needs to be proper long-term planning carried out to increase the workforce in a managed way.

Radiotherapy UK, supported by IPEM, carried out a survey of radiotherapy professionals to understand the current issues being faced in radiotherapy services.

The survey, carried out in August and September 2022, was the fourth of its kind since 2020 and showed a worrying trend that the situation in the service is getting worse.

It signals the worst ever workforce crisis within the radiotherapy community. The radiotherapy workforce is highly specialised and technical, and hugely important for a functioning cancer service, but there is currently not sufficient trainees or training in place. Survey results point to serious concerns amongst the respondents on machine and workforce capacity, and a significant worry over future demand.

Despite the importance of radiotherapy as a vital cancer treatment service, more than 90 per cent of survey respondents felt the Government did not understand the impact of current issues within radiotherapy on cancer patients or on the workforce themselves.

Leo Cancer Care

Topic: Please detail the current status of the Radiotherapy machines and equipment from your own experience and any improvements you feel are necessary?

New report backs Leo Cancer Care's upright proton beam therapy system and shows it may help cancer patients and the NHS by reducing waiting list backlogs

Patient backlog

Proton Beam Therapy (PBT) has clear benefits for patients and because it is precisely targeted and results in less beam exposure to healthy tissue around tumors compared to conventional photon therapy, which is a more commonly used radiotherapy treatment.

The NHS recently opened PBT cancer treatment centres in Manchester and London at an estimated cost of £250m with the capability to treat approximately one per cent of the UK cancer population. However, general clinical guidelines indicate that PBT would offer significant benefits for 10% of all future radiotherapy treatments.

The report stated: 'Currently, a backlog of patients awaiting cancer treatment due to the coronavirus pandemic resulted in prioritising patients by the severity of their cancer. Identifying methods of reducing patient waiting times, therefore, is essential.'

Delivering a better ROI for proton therapy in the UK

An in-depth cost-benefit analysis of a ground-breaking upright solution to deliver Proton Beam Therapy (PBT) to treat cancer suggests the approach could have significant advantages for patients and the NHS.

Leo Cancer Care's Marie™ Upright Proton Therapy Solution

Research undertaken by Unity Insights in conjunction with Kent Surrey Sussex Academic Health Science Network (KSS AHSN) working to transform lives through innovation, focused on Leo Cancer Care's Marie™ upright PBT solution, as seen above.

The system, which takes up a fraction of the space and costs significantly less than traditional gantry installations, delivers therapy to patients while supported in an upright position by keeping the radiation beam fixed and slowly rotating the patient.

The Unity Insights research* – conducted with the NHS, KSS ASHN and Leo Cancer Care – aimed to create a cost-benefit analysis and budget impact model to identify whether the Marie™ cancer treatment solution was more cost-effective than existing NHS PBT equipment.

Key results

Key results from the Unity Insights study show that:

- As radiotherapy treatment is costly and time-consuming, use of the Marie™ system could lower the cost and waiting list backlog in the NHS;
- Cost-benefit analysis calculated that the return on investment (ROI) for the NHS equipment averaged at £0.61 for every £1 spent, while the ROI for Leo Cancer Care averaged at £0.91 for every £1 spent between years two and 20.
- The rate of secondary malignancy development highlighted was 7.5% and 5.2% for photon therapy and PBT, respectively. Indicating proton beam therapy as better medicine and resulting in a cost-benefit by reducing secondary treatments required.

'In this case, Leo Cancer Care is likely to yield a greater ROI compared to existing NHS machines,' it stated.

These results, say Leo, help us to imagine a future where we can consider proton therapy and photon therapy side by side in the NHS.

There is a clear cost reduction in treating with proton therapy by reducing secondary cancer malignancies, and paired with the cost-benefit of upright technologies means closing the gap to proton therapy, which is currently considered inaccessible to the majority of patients due to the size and cost of the technology.

Lower costs

The document also made recommendations for further research on whether Marie™ improves the quality of cancer treatment and if further benefits could be identified, such as with patient throughput.

It also proposed a cost-benefit analysis to determine the impact of future Leo Cancer Care technology within the NHS, such as the Ruby™ solution which administers photon therapy.

In conclusion, the Unity Insights report stated: 'Overall, the findings presented throughout this evaluation suggest that Leo Cancer Care's machines yield lower costs and are easier to construct compared to existing NHS machinery.

'Further research may be conducted into PBT and Leo Cancer Care to provide the NHS with the reassurance that Leo Cancer Care is a cost-effective, safe machine that can be used to eradicate the existing patient backlog.'

Smaller footprint

The report noted that traditional particle therapy systems require large buildings to house equipment weighing up to 600 tonnes with 360 degrees of shielding, while the Marie™ system is compact enough to be fitted within an existing hospital infrastructure and, as a consequence, could provide considerable financial savings in facility construction alone.

Stephen Towe, CEO of Leo Cancer Care, welcomed the findings from the KSS AHSN Unity Insights study.

He said: 'We have long believed that our solutions are cost-effective and also have a smaller footprint than current proton beam therapy solutions. We are delighted that the Unity Insights came to the same conclusion.

'We believe that our systems can offer the NHS significant benefits, not only in more cost-effective use of resources but also in helping cut the severe cancer care backlogs it is currently facing.'

'The main takeaway for me from this report is that, even with an incredibly conservative financial model for the Leo technology we are still seeing a 50% improvement in the ROI to the NHS – I expect that the real numbers will be much more favourable. These numbers are already close to showing that the expected savings due to a reduction in secondary malignancies as a result of the use of proton therapy compared to conventional radiation therapy will outweigh the higher costs associated with proton therapy – that is a huge result.'

Saving lives

While PBT is seen as an expensive cancer treatment solution with high capital costs, particularly due to the scale of facility construction, it has significant benefits for cancer patients through its ability to target tumor cells more precisely and see a higher dose of radiation delivered to the tumor, but less radiation to nearby healthy cells.

'Providing PBT systems to the NHS that are easier to install, cost less, and take up less space, can offer significant benefits to the NHS, and in turn, to the cancer patients it treats,' added Towe.

A core aim of the NHS Long Term Plan (2019) is to save thousands more cancer patients' lives by implementing improvements in cancer diagnosis and treatment via more precise and safer therapies, including advanced radiotherapy techniques such as PBT.

ENDs

*****To read the full Unity Insights report by the Kent Surrey Sussex Academic Health Science Network (KSS AHSN) click here and request the report.

Leo Cancer Care offers two solutions to assist in cancer treatment:

Marie™ is a solution for upright particle therapy. It features dual-energy diagnostic quality CT at the treatment isocenter to enable real-time adaptive therapy and is partnered with a stationary fixed beam delivery system. It has a sophisticated patient positioning system, allowing for imaging and treating of all particle therapy-specific anatomical sites in the upright position.

Ruby™ is complete upright treatment solution which consists of a beam generation system that allows for a precise photon beam to be projected onto cancer cells.

MEDIPASS

Are the existing processes, budget mechanisms and policies sufficient for delivering the innovations in IT and technology needed for world-class radiotherapy?

The clinical benefit and ease of treatment for patients using Radiotherapy, warrants investment in both time and funding. A coordinated approach is required to provide the best technology in Radiotherapy for patients which must be closer to home. Technology will continue to improve, enabling more cancers to be treated effectively and potentially, commissioners need the understanding that investment in radiotherapy technology could reduce the need for costly medical and surgical intervention.
The NHS sometimes lags behind with innovation particularly compared with Europe and the private sector and the processes for equipment refreshes are a drawn-out laborious process.

In what ways can the full technological benefits of radiotherapy be realised, and what is hindering this?

Lack of funding in innovation for healthcare practitioners is hindering progress whilst we go through post-covid catchup. Greater investment in clinical trials and better collaboration with European Oncology leaders is needed, so that use of proven advancements can be expedited with in the UK, with advanced treatment methods such as SGRT, being offered to all NHS patients nationally and quicker, not just at selected sites, and often, what is in line with the private sector offering.
The introduction of AI for planning would significantly reduce the time required to plan for complex treatments. There is currently a regional project in the East of England that is focusing on IT, that will enable AI contouring which frees up clinician time to enable more patients to be planned. The group should ask for early findings and projected outcomes.

Do you feel that Radiotherapy is funded sufficiently in the UK?

Radiotherapy in most cases provides a cost-efficient therapy for treating cancer, and therefore should receive greater investment to provide more capacity – the ability to treat more patients without delay.
Funding for radiotherapy should include a renewed investment in bursaries across the discipline for students to train without the risk of debt. This in the longer term would be more cost effective for the NHS and reduce the need for medical oncology and surgery.
Funding should be targeted to localities and be more accessible for patients. Flexible service models (longer hours, extended opening times) suit only a small percentage of the population. Few patients want to go out of an evening for radiotherapy, further research is needed into how IT can support treating more patients using existing linacs, more linacs are not always the answer.

Can you give examples that could be described as 'red-tape' or bureaucracy that hold radiotherapy back from the full benefits that it can provide?

Each country in the UK has different funding models when purchasing large equipment in the NHS, there is a different route to market for hospitals depending on where they are located. The variations in the approach appear to create regional inequalities not only in treatment type available but attracting talent to work at the centre.

Society and College of Radiographers

Thank you for the opportunity to submit a response to the All Parliamentary Group on Radiotherapy (APPG-RT) inquiry into the current and future state of radiotherapy provision across the UK.

The Society of Radiographers is the professional body and trade union for all those practicing in medical imaging and radiography. The Society of Radiographers (SoR) represents over 33,000 members, most of whom work in the NHS across all 4 nations, at all grades across clinical imaging and cancer / radiotherapy pathways of care.

Radiotherapy is a core treatment option for people diagnosed with cancer and the provision of high-quality equitable care is the priority for radiographers working with the multidisciplinary team. This includes both imaging required and undertaken by the Diagnostic Radiographer workforce for cancer diagnosis and treatment by Therapeutic Radiographers.
Therapeutic radiographers are not only responsible for the planning and delivery of accurate radiotherapy treatments using a wide range of sophisticated and technical equipment, they have unique expertise and skills required to care for patients before, during and after radiotherapy.
A response to questions posed are as below and the Society and College of Radiographers welcomes the opportunity to discuss in further detail at forthcoming events.

Do you feel radiotherapy is given priority that its clinical importance deserves in Government policy making?

The NHS is at a crossroads. The decisions about which direction it goes next are, we believe, the most important since its foundation in 1947 – there has never been a more critical time for the health service, inclusive of radiotherapy. However, after record levels of investment and support during the pandemic, there has never been a better chance to set new baselines and a fresh direction.
We believe there is a clear choice.

- continued high levels of strategic investment with sustained additional funding found during the pandemic and a need towards prioritising long term work-force planning in partnership with the workforce; or
- play towards and re-enforce the existing culture of reactive, short-termism that anchor the structural barriers to recruitment and retention. This would at best leave the NHS stalled at the crossroads, or at worse, see it fatally heading in the wrong direction towards the cliff edge.

There are additional areas to spotlight including:

- Removing structural barriers to retention of New Professionals early in their careers, including freezing pension increases that disproportionately impact this group and recommending significant improvements to starting pay;

- Recommending Government, employers and unions look at other innovative approaches to addressing structural barriers for New Professionals, such as facilitating student loan holidays, enforcing protection on study time and exposure to excessive hours.
- Providing the resources and the flexibility for the NHS to develop relocation packages, especially to target the recruitment of international recruits, in competition with the private sector; and
- Support ending the NHS Immigration Surcharge for NHS overseas staff and their families.

The use of medical imaging has soared in recent decades - both in diagnostic radiography (with the expansion of screening programmes and greater demand for diagnostic scans); and therapeutic radiography, with cancer treatment technologies changing and expanding at a revolutionary speed. This rocketing demand is forecast to continue. Radiography and HCPC registered Diagnostic and Therapeutic radiographers are remarkably cost-effective and efficient so getting radiography right is at the core of the NHS's ability to meet any and all of its big public targets – cancer survival, stroke, cardiac and respiratory, and others. Throughout the Covid-19 pandemic our members have been on the frontline in all areas of the NHS and as the NHS looks to recover, radiographers are again central to supporting the recovery of elective programmes disrupted by the pandemic and in supporting treatment needs for cancer patients.

The Government have publicly recognised the need for an Imaging workforce strategy, including endorsing Sir Mike Richards' proposals from his review of diagnostic provision across England in November 2020. As Richards' identified, radiography was at a cliff edge before the pandemic and has now fallen over the edge. If the NHS is a national priority then radiography must be one of the NHS's key strategic priorities.

Please give some comments on Radiotherapy workforce experiences either from yourself or colleagues?

The College of Radiographers (CoR) Education and Career Framework (ECF) (fourth edition) provides guidance for the education and career development of the radiography profession.

The ECF defines the various levels of radiography practice and the educational standards related to each of them. The framework informs the CoR's pre- and post-registration programme approval process. It also informs the accreditation of individual members of the radiography workforce through the CoR accreditation schemes.
Importantly, the goal of the ECF is to support improved outcomes for patients through the education and development of the radiography workforce.

Workforce detail available for both Diagnostic and Therapeutic Radiographers via the SoR annual census

Recruitment and Retention

Presently, we are losing the recruitment and retention battle. The diagnostic radiography NHS workforce has been growing steadily at around 3% since 2014, with the therapeutic workforce has been growing at around 4% a year. Current funding and workforce planning appear to assume a continued growth of around 3% a year. However, NHSE figures show, if the Richards' report and other elements of the Imaging Strategy are accepted then staffing levels will need to rise by a further 18% in Diagnostics and 16% in Therapeutics between 2021 and 2026. This translates into the Diagnostic radiography workforce needing to grow by 6% a year, or double the current funded projections, each year until 2026 – a 28% growth in total.

NHSE and HCPC figures show student numbers are continuing to increase. The 2020-21 intake in England equated to 5.2% of the whole current registered diagnostic radiography workforce. The equivalent in therapeutic radiography is 7.8%. This is encouraging but unlikely to be enough. It is short of the 6% a year known to be currently needed for diagnostics. Leaver rates for the NHS diagnostic radiography workforce in 2021 were also 5.2%. Unless fewer people leave; and/or more are recruited from new sources (such as internationally) this will not be enough to sustain the necessary workforce growth.

We have significant investment in a Health Education funded workforce reform programme of work
A full report will be available in March 2023 but please see the attached for an outline of the the programme of work to date. Some key findings to date:

- The vast majority of therapeutic radiographers are educated and trained via a traditional undergraduate programme. The numbers trained by NHSE region varies, so some services do not have access to newly qualified staff, many of whom choose to take up employment in prestigious centres

- Student attrition from pre-registration therapeutic radiography degree programmes has always been relatively high when compared to other healthcare programmes (table 2). Student retention is improving, however approximately one fifth of the cohorts do not complete.

- There are very few therapeutic radiography apprentices in training, largely because there is no central commissioning or guaranteed funding support for the services to recruit and train apprentices. The managers are reluctant to free up substantive posts to enable them to recruit apprentices. The result is that currently there are only two universities (both in England) that offer a therapeutic radiography apprenticeship programme.
  Solution: Central funding to enable a sustainable therapeutic radiography apprenticeship model.
  One of the reasons this is very important is that there is evidence from other healthcare professions that attrition from apprenticeship programmes is very low.

- Very few radiotherapy departments employ support workers and have a 'grown your own' staff policy. In departments where support workers are employed the

managers report that this workforce, particularly qualified Assistant Practitioners, make a significant contribution to the work of the department, often live locally and are highly valued by patients and other staff.

Solution: A UK wide model of employment and deployment of support workers in radiotherapy departments, to limit any further constraints on the already stretched department staffing budgets.

Please outline the present and future needs to the multi-disciplinary workforce in radiotherapy.

Teamwork is fundamental to the delivery of these cancer treatments. The nonsurgical cancer treatments workforce delivers treatments through shared responsibility and expertise. Skill mix has been embraced and there are fantastic examples of patient care as a result but the challenge are low workforce numbers.

As with both Oncologist's and Physicists the UK therapeutic radiographer workforce are under significant pressure.

From the SoR 2021 workforce census, reports of high vacancy rates impacting patient care and staff morale:

- The current vacancy rate for the NHS radiotherapy radiographic workforce is 8.4% with 304.9 WTE radiotherapy radiographic positions vacant. This is the highest recorded vacancy rate since we began collecting data in this format in 2012. The rate has grown from 6.1% in 2018 to 8.4% in 2021.
- The current vacancy rate for NHS therapeutic radiographers is 8.1% and for associated APs/TAPs and clinical support workers it is 18.0%.
- The number of WTE posts vacant are at least 30% higher than the number of new graduates expected to qualify this year;
- There are concerns around the high numbers of staff working out their notice period and on parental leave;
- Half of departments report needing to reduce capacity due to staff shortages;
- There are insufficient confirmed new starters to fill vacancies and expected delays in HCPC registrations are likely to exacerbate the issue

CoR (2022) Education and Career Framework for the Radiography Workforce Available at: https://www.sor.org/learning-advice/professional-body-guidance-and-publications/documents-and-publications/policy-guidance-document-library/education-and-career-framework-fourth

SoR (2021) Radiotherapy radiographic workforce census available at: https://www.sor.org/learning-advice/professional-body-guidance-and-publications/documents-and-publications/reports-and-surveys

Cancer Research UK (December 2017) Full Team Ahead, Understanding the UK Non-Surgical Cancer Treatment Workforce, Available at: https://www.cancerresearchuk.org/sites/default/files/full_team_ahead-full_report.pdf

ESTRO Vision statement. Radiation Oncology, Optimal Health for All, Together -2030 Available at: https://www.estro.org/ESTRO/media/ESTRO/About/190417-ESTRO-Vision-Paper-2030.pdf

SCoR (2016) Achieving World-Class Cancer Outcomes: The Vision for Therapeutic Radiography, Available at: https://www.sor.org/learning/document-library/achieving-world-class-cancer-outcomes-vision-therapeutic-radiography

South West Radiotherapy ODN

Please give any views, from personal or professional experience, on whether the UK radiotherapy provision is able to cope with urgent present and future challenges in cancer care.

No. Current arrangements around funding of essential equipment replacement are slow and burdensome delaying modernisation of treatment units.
Staffing across all staff groups required for radiotherapy is insufficient to meet demands in terms of volume yet alone aspirations to meet national and NHSE time to treatment targets.

To what degree are Government and NHS England's existing plans for radiotherapy sufficiently ambitious?

There are some encouraging investments in protons and MRI guided RT in a limited number of centres.
However, roll out of other potentially practice changing technologies has not taken place. There are missed opportunities to invest in rapid roll out of AI to support auto-contouring to speed up the planning process, in enabling units to upgrade to more advanced planning systems, to provide the staffing needed to implement these developments, to invest in surface guided radiotherapy (which would benefit patient experience and streamline treatment processes).

Do you feel radiotherapy is given priority that its clinical importance deserves in Government policy making?

No. There is disproportionate investment in systemic anti-cancer treatment, often with minimal benefit and underfunding of radiotherapy technologies and earlier detection of cancer to increase cure and outcomes.

Are the existing processes, budget mechanisms and policies sufficient for delivering the innovations in IT and technology needed for world-class radiotherapy?

No.

In what ways can the full technological benefits of radiotherapy be realised, and what is hindering this?

Funding for AI.
Completion of ProKnow roll out.
Poor general IT across Trusts – need funding to implement.
Staffing investment to allow delivery of service and implementation of developments.
Funding for technological advancements equitably in the NHS eg LINAC replacement, SGRT, immobilisation equipmen tfor advanced techniques (ie SABR), 6 degrees of freedom couches for LINACS if expecting roll out of SABR (ie matching the aspirations for advanced treatments with sufficiently highly spec machines).

Please detail the current status of the Radiotherapy machines and equipment from your own experience and any improvements you feel are necessary?

X2 LINACs older than 10 years. 3rd one likely to go past 10 years by the time of completion of replacement programme.
Gammamed brachytherapy unit will be >10 years old by time of funding allocation.

Please give some comments on Radiotherapy workforce experiences either from yourself or colleagues?

The workforce is stretched in all staff groups.
The current difficulties with implementation of systemic treatment NICE TAGs and expanding systemic treatments is also consuming clinical oncologists time and reducing time available for radiotherapy – this is not sustainable.
There is a shortage of radiographers, suitable dosimetrists and physicists.
Systems in place acts as a barrier to creative solutions eg variation in management and expectations for apprenticeships for radiographers, insufficient training places to keep up with demand for staff.
Advanced or specialised roles are developed to different standards at different centres, making inequitable jobs and losing clarity about job expectations and descriptions.
Expectation to staff some new roles such as late effects management and consultant radiographers to support clinical oncologists in the present climate of insufficient radiographer workforce is further contributing to depleting the pool of staff able to deliver radiotherapy.
Development of such specialist roles in the setting of inter centre competition to attract staff is contributing to making core radiographer roles potentially less attractive (reducing retention) and is leading to variation in development pathways and quality of experience (which is difficult to assess).
Fear of losing staff and competition is driving early promotion with concerns about depth of knowledge and experience.

Please outline the present and future needs to the multi-disciplinary workforce in radiotherapy.

Please see above.

Do you feel that Radiotherapy is funded sufficiently in the UK?

No

Can you give examples that could be described as 'red-tape' or bureaucracy that hold radiotherapy back from the full benefits that it can provide?

- Having to create long, complex business cases to justify the replacement of Linear accelerators before they reach the end of their working lives (10 years).
- The number of machines and their lifespans are known nationally and their funding and replacement should be provided nationally without re-justification of the (known) need.
- Obtaining IT equipment – comes with long lag times for basic equipment, being tied to contracts or manufacturers (eg computer monitors).
- Processes in NHS Foundation Trusts appear more efficient in allowing application for and funding of staff and equipment. This presents significant difficulties for non FT Trusts.
- Even basic orders eg stationary can take a long time from order to delivery.
- Allocation of capital funding is extremely challenging even when non-capital funds are available and this restricts addressing individual Trust's needs, creating inequitable distribution of funding support eg one Trust may require significantly

more equipment replacement one year compared to another but both are given similar allocations.

- Risk assessment process is burdensome and time consuming and of questionable quality.

VARIAN

Linear accelerator production is a complex process. Linear accelerators have many features which during the sales process we discuss with customers to best fit their needs. Sporadic funding input from NHSE of £130M or £32M as has 'recently' happened to replace aged equipment – although very welcome for customers, puts the procurement system under pressure and gives little time, if any, for customer to evaluate and request what is the right configuration for them. Three months from order and delivery is a challenge for manufacturers (understatement). Funding also only covers the core system and so additional features that could improve efficiency, quality of treatment, innovation are not funded and trusts have then struggled to invest and adopt. In addition many of these systems then sit in storage until the customer can actually install months later.

Ring fenced funding with planned replacements **year on year** would avoid this issue and allow a planned approach. Funding for innovation should be included. Expansion of services should also be reviewed and access to treatment units to handle the anticipated growth in cancer incidence and reducing travel times.

We have introduced a new linear accelerator that can and is easily treating 6 patients an hour with high quality IGRT and IMRT/VMAT treatment every time. And a significantly improved patient experience. Automated workflows to aid workforce issues. Replacement at 10 years allows new innovative products such as Halcyon to be adopted.

NHSE working in partnership with Industry – real continued engagement and partnership. We have the solutions that can help with IT infrastructure, workforce issues with AI products, quality and consistency of treatment delivery with products such as Rapid Arc and AI Rad companion.

In conjunction with our imaging colleagues in Siemens Healthineers (SHS) – we are looking to implement workflows that significantly reduce the time from diagnosis to treatment. Investors in CDC's should also be looking at treatment options and pathways once the patient is diagnosed. If a new CDC is being designed and built – considering a bunker for a linac in the build design rather than some that is bolted on afterwards when the need is identified, would be the most cost effective process. A Halcyon Bunker requires considerably less shielding as well as utilizes less power. And is installed and clinical is a month as opposed to 3 – 6 months as with a TrueBeam and conventional linac.

Recognition and investment to support new delivery techniques – theses come along usually around 5- 10 year timeframes ie Intensity modulation radiotherapy IMRT, VMAT Volumetric Adaptive Radiotherapy, SABR Stereotactic Ablative Radiotherapy , and now Adaptive Radiotherapy. These are key developments to enable dose escalation and reduce toxicity of treatment. Scotland has invested heavily in Adaptive Radiotherapy – 3 ETHOS will be installed and clinical in Scotland this year . They are also investing in MR in radiotherapy – every oncology center. NHSE will not fund ETHOS although NHSSC have invested in a bulk deal to offer ETHOS to customers discounted as a multiple system order placed.

We continue to support all the points in the APPG Manifesto of which we have provided input.

Finally what I would say is that talking to our customers – they are having to rebuild business cases that were already approved by their trusts – to submit to the ICB/ICS's alongside other oncology departments within their networks. This is causing significant delay and risk again to replacing equipment on time. Without these approvals they are not moving forward with their projects that were already to have been planned to start.

From what we see in our discussions with our customers – many are working to their linac capacity and working extended hours and weekends and still with large waiting lists. This is treating patients with Hypofractionation for Breast and prostate. Departments not at capacity this is often due to lack of oncologists and hence patients are not being referred for Radiotherapy. This may in some way explain the low 27% of patients receiving Radiotherapy in England as opposed to the recommended 50 – 60%.

VISION RT

Please see below our written evidence submission for the APPG for Radiotherapy's inquiry into radiotherapy and the cancer crisis.

- Surface Guided Radiation Therapy (SGRT) makes radiation therapy safer, more accurate and more comfortable for patients. It is a technology developed by a British company and several NHS trusts have collected data to show that use of SGRT has increased their setup and treatment efficiency:
    - **University Hospital Southampton** showed significant reductions in "total time in room" for radiation therapy treatments, enabling "18 more appointments per week"[1]
    - **Guy's Cancer Centre** in London showed setup time-savings across the vast majority of their treatment sites[2]
    - **QE Birmingham**: over a 10-week audit, use of SGRT for Sim reduced the need for rescans from 14.9% to 2.3%[3]
    - **The Christie, Manchester** saw capacity increase by 458% through use of SGRT for DIBH treatments, from 60-80 breast patients/month to 366[4]
- If rolled out more widely, these efficiencies have the potential to increase efficiency and decrease RT waiting times throughout the NHS
- SGRT works with existing Linacs, can be installed in a few days, and requires minimal training

References:

1 Shaw and Peares, University of Southampton, SGRT London Conference 2022

2 Dobson, Guys and St Thomas NHS Trust, NHS webinar series

3 Allen and Kilkenny, University Hospital Birmingham, SGRT London Conference 2021

4 McGrath, Christie NHS Foundation Trust, SGRT London Conference 2021

University Hospitals of Coventry & Warwickshire – Radiotherapy Department

Please give any views, from personal or professional experience, on whether the UK radiotherapy provision is able to cope with urgent present and future challenges in cancer care. Currently not sufficiently due to workforce issues.

To what degree are Government and NHS England's existing plans for radiotherapy sufficiently ambitious? Government and NHSE are trying but ambition is not directed at points that could make the biggest differences. We need funding for AI auto contouring products that would help support radiotherapy professionals by reducing time it takes to outline organs at risk and nodes, processes that can take hours by hand, AI does it in minutes and getting better, 50k approx.. per centre would support for 12 months. Funding BSc students for fees and accommodation with placements. HEE monies to be identified over 3 years on a rolling programme rather than 12 months. This gives stability to both Trusts and HEI's as they can plan and budget for growth where needed.

Do you feel radiotherapy is given priority that its clinical importance deserves in Government policy making? No, I think radiotherapy is the forgotten hero of Oncology treatment and needs addressing. The Cancer Plan doesn't even mention Radiotherapy yet 25% of the population will require radiotherapy, with 40% being cured and using only a small fraction of the Oncology budget, doesn't seem proportionate.

Are the existing processes, budget mechanisms and policies sufficient for delivering the innovations in IT and technology needed for world-class radiotherapy? No, commissioners are not aware of what's available and not willing to engage sufficiently to address the problem, AI auto outlining is an example. The inability to utilise radiotherapy specific MRI for planning is another area of importance but funding is difficult, however will make improvements in what can be planned more accurately reducing toxicity and late effects.

In what ways can the full technological benefits of radiotherapy be realised, and what is hindering this? Funding models are not consistent. Some years you'll get central funding for linacs, other years fight with Trusts conflicting capital priorities, linacs aren't cheap as a one off payment.

Please detail the current status of the Radiotherapy machines and equipment from your own experience and any improvements you feel are necessary? We need to undertake a replacement programme for our linacs as 1 linac already 10 years old, we await an outcome. We have just replaced a planning CT and have a second that is 12 years old, we would like to replace with a MRI scanner, however that has to be a shared resource with Radiology to get anywhere close to being financially viable as there are no tariffs for such planning mechanisms.

Please give some comments on Radiotherapy workforce experiences either from yourself or colleagues? Workforce is the biggest challenge in all Radiotherapy professionals; Consultant Clinical Oncologists, Clinical Scientists, Dosimetrists, Clinical Engineers and Therapeutic Radiographers. We have lost staff during and post Covid to other Trusts but also out of the NHS. Staff feel warn down and with staff able to move where they want, we

lose staff to other centres so newly qualified staff can move back with parents because it too expensive otherwise.

Please outline the present and future needs to the multi-disciplinary workforce in radiotherapy. As previous comment need to fund students so students that want to undertake therapeutic radiography don't come away with huge debt. Most undergraduate students are coming into the profession through clearing which isn't ideal for a profession that you need a reason to undertake, this isn't just a job.

Do you feel that Radiotherapy is funded sufficiently in the UK? No as above.

Can you give examples that could be described as 'red-tape' or bureaucracy that hold radiotherapy back from the full benefits that it can provide? The commissioning process has helped previously with improvements in linacs and opening of proton centres but it's stopped there, we are not able to develop the service as it could, MR linacs, smaller based proton accelerators roll out of Stereotactic Radio Surgery (SRS) for brain mets. SRS could be set up in many centres for brain mets but you require the equipment to support.

PATIENT/FAMILY

I was diagnosed with prostate cancer (T3) in June 2016. I was referred to the Christie Hospital in Manchester (a specialist cancer hospital) where I was then treated – several months on Hormone injections followed by Brachytherapy followed by fifteen days of radiotherapy. As a result my PSA results became almost undetectable and after half yearly reviews I was told that the condition was now T2 and after 4 years I was told that there be no need for one to one reviews.

I consider myself to be extremely fortunate that I was treated at the Christie where there was up to date equipment and trained staff. In my opinion it goes to how that where the investment is made the results can be spectacular.

I received 30 days high dosage radiotherapy in March/April 2020 at James Cook Hospital, Middlesbrough for Stage four Mouth Cancer. This was at the start of the pandemic, the staff were excellent we were treated in another building and at weekends,I am very grateful to the team. I am still in Remission thankfully, but would say I have since learnt that if I had received treatment with a proton beam accelerator, I would not have the horrific side effects I have to suffer daily, I understand there is only I such machine at the Christie Hospital in Manchester. In the National Health service, proton beam machines hit the tumour only and destroy it and do not damage other tissues. Should be the machine of choice g for mouth cancer patients.

After surgery to remove two different cancers in my breasts (one each side) in 2009 I was given 6 weeks radiotherapy within 3 months of surgery. I am sure this saved my health, even my life. But I do not believe the same care would be extended so quickly now. I was diagnosed within a month of finding the first lump and had surgery within 2 months, and even then the NHS was short of nurses! I cannot stress the importance of early diagnosis and treatment in breast surgery.

I am a young British female (in my 30's), diagnosed just in 2022 with Triple Negative breast cancer which is an aggressive form and kills many young women every year. In addition to this, I received blood test results confirming that I have a Breast and Ovarian Cancer mutation.

From the very start until present day, I have experienced numerous issues which have caused delays and adverse impacts on my care and treatment as a result of insufficient policies, protocols, budgetary restraints and issues in terms of resource within the NHS cancer pathway. In my opinion and certainly in my case, one knock on impact on treatment affects the other like dominos.

Delays in treatment, issues with scans and further delays – knock on effect on radiotherapy

For instance, my General Practitioner delayed referring me to hospital by approximately 1 month, insistent that my large lump was no more than a non-cancerous cyst. When I finally saw another GP at that practice for a second opinion, they referred me immediately on the cancer pathway for the two week wait to my local hospital. Only for me to discover the hospital could not offer me an appointment for approximately a month as they were not meeting their KPI's on the 2 week wait – I said this cannot wait because my lump and the pain was getting worse by the week or every few days and was growing bigger. I was told by the hospital that my only option was to attend A&E which I did, unaccompanied on that same day. When I arrived, at A&E, the hospital (numerous doctors too) admitted they didn't know what to do because they had not had someone attend outside of the two week wait, and tried to tell me I would have to go home and await the cancer pathway appointment. I remained there insistent it needed to be looked and dealt with that day. Finally, after being there all day and examined numerous time by various staff, I was later referred to the breast clinic that afternoon. I eventually had an ultrasound and they were unable to obtain a clear picture due to my breast density (apparently can be a common factor in young women). Then I was sent for a mammogram (which obviously currently is not routinely undertaken for my age group!) and had 9 biopsies taken including from one of my arm pits as well as breast in question. That day, following the mammogram I was told this showed where the tumour was thought to be in the breast, a large patch of visible pre-cancerous calcification spots and possible lymph nodes involvement which interestingly only showed up on the mammogram.

I had IV chemotherapy, then a long operation of a double mastectomy with full lymph nodes clearance from one arm pit. Followed by 3 weeks of chest radiotherapy (every day). It was found that post surgery when my tissue was tested, that I still had active tumour remaining in my breast and lymph nodes despite the chemotherapy, therefore it seems the chemotherapy did not work well, if at all, or certainly not as well as hoped. Although ultrasound scans and MRI's were taken of my breast throughout the IV chemo, my oncologist struggled to obtain a clear picture of my breast due to my breast density and had difficulties seeing/establishing how it was responding to the IV chemotherapy. Never at any stage was I sent for a mammogram or any body scans to check for spread. It is thought now, that perhaps I should have been pulled from the chemotherapy at an earlier juncture.

This was alarming in itself. There were also delays in me having surgery because my former surgeon delayed on referring me to my current one, he had also referred me via my GP and my GP practice delayed on this too. Therefore my surgery was later than would have ordinarily have been advised. When I received my pathology results, despite the fact I am a Triple Negative cancer patient I am already at high risk of spread or recurrence at any time given its very aggressive nature, coupled with finding active tumour despite the chemotherapy, all that was offered to me after me pressing for scans was a CT of my abdomen! I pressed for a PET scan, yet there is apparently some national shortage of the radioactive dye and it seems even at that juncture I wasn't considered a priority for it!

As I had just commenced radiotherapy to the chest I started to experience short periods of headaches for a few days. I raised this and really had to press to have an urgent MRI of my

head – after much persuasion I had one and it transpired I now have a few lesions in my brain (so now I am diagnosed with Stage 4 Triple Negative breast cancer with secondary metastases in the brain). My prognosis is alarmingly short and I am told my treatment options are limited – including radiotherapy to the head and a DNA blocker tablet for my genetic mutation. Apparently the radiotherapy wont cure me and it will only (hopefully) help with symptoms such as headaches and slow tumour progress. I was then pulled into urgent overall head radiotherapy. We wait to see how I have responded, further to up and coming scans, and then it will be determined if I am to have any further radiotherapy thereafter.

It is quite apparent that when a patient is staged as a 3 i.e. no spread to other organ – such as I earlier this year – it is not NHS protocol to scan the brain! Yet you are put under some illusion that or indicative impression that a full body can has been carried out to determine such a staging diagnosis. It is unclear then how a consultant, in these circumstances, can determine at that juncture no spread to other organ when from an evidential point of view they do not know. Its obvious that the earlier you can something the better chances you have at mitigating risks and utilising potential treatment options. I may have only had one brain metastases in March for example, and if that was the case maybe other treatment pathways may have been open or it might have been easier at that juncture to treat one liaison with radiotherapy.

Therefore, I think its also important to look at what the knock on effects are on radiotherapy due to delays caused by other departments.

<u>Issues with radiotherapy machinery</u>

I have experienced for myself the difference between a new radiotherapy machine which was implemented at one site I attended, versus an old one. The former, although had teething problems with the engineer having to be called out at one point every morning, once up and running the process seemed to be more focused, streamlined, less clunky, less time-consuming, smoother and not as stressful for the patient. I felt more at ease receiving chest radiotherapy with the new machine in comparison to the older machine.

I was then switched to another hospital site with an older radiotherapy machine. Use of it was clunky, I observed that the radiotherapists seemed to have to work much out manually which took more time and it didn't instil me with a great deal of confidence compared to what I felt was a different level of precision with the newer model on the other hospital site. I was tired and the process just seemed so convoluted and unnecessary complicated and we had to repeated it over and over again every time I arrived every day for chest radiotherapy. A cancer patient really does have enough to contend with and navigate, and adding such issues into the mix really does provide an additional and unnecessary stressor.

Despite any issues and stressors and restraints the radiotherapy staff have to contend with, I have to say how impressed I am with them for how they navigate things and put the patient first to make them feel as relaxed as possible. This is quite a stark contrast of my experience of both oncology and surgery. Radiotherapy really is a different cultural and therapeutic beast. I don't know what I would have done without them. Radiotherapy is such an essential and effective form of treatment and yet I honestly do not believe that

radiotherapy and the wonderful staff providing the same receive the level of kudos and recognition they truly deserve.

Many thanks for taking the time to review this. Should you require any further information, please do not hesitate to seek this via Radiotherapy UK who may contact me for the same.

My husband had metastatic melanoma. He died almost five years ago but in his final six months the pain relief he got from radiotherapy made a huge difference to his quality of life.

My next door neighbour died of prostate cancer in November last year. He too was able to have radiotherapy to reduce the tumours and give him relief from pain, and longer to live.

Radiotherapy makes a dramatic difference to cancer patients. Even in those patients where it can't completely destroy the cancer, radiotherapy reduces pain and extends the time the patients have with their loved ones.

I write with my concerns regarding my brother . I feel totally let down from the start He initially discovered he had none Hodgkin's lymphoma in 2011 Sadly this disease has returned-along with various cancers (yet still to be confirmed) From April 2022 …. It has been on going -complaint after complaint …,, my sibling simply falls into insignificance…… a none smoking ..healthy none drinking -healthy eating being !

He's been totally left by the gutter …. Myself and other various family members have endeavoured to chase appointments etc . My brother is a hard working -tax paying national … and has been since 1961 ..

I feel totally let down by this government-self conceited and totally blinkered to "workers"

After various test / scans /etc …. We still haven't started vital treatment . I myself am sick of chasing appointments…. What do we have to do to get answers ? And more so treat my brother ? Sad sad country / 💔
